



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,089	09/10/2003	Lee Jen Chen	MXIC-P910270	6595

7590 09/07/2006

Stout, Uxa, Buyan & Mullins, LLP  
4 Venture, Suite 300  
Irvine, CA 92618

EXAMINER
----------

HOANG, QUOC DINH

ART UNIT	PAPER NUMBER
----------	--------------

2818

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/661,089	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Quoc D. Hoang	<b>Art Unit</b> 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7-11 and 13-17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-11 and 13-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/17/2006 has been entered.

### ***Response to Amendment***

2. Amendment filed 8/17/2006 has been entered. In the Amendment, claims 1-6, 12 and 18-25 have been canceled. Claims 7-11 and 13-17 are pending in the application.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-11 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel (U.S. Pat No. 5,968,587).

**Regarding claim 7**, Frankel teaches a method comprising:

forming a glass layer (1008) upon a substrate (1004) via a first chemical vapor deposition process (col. 40, lines 51 through col. 51 line 25, col. 61, lines 12-23, and Figs. 19A-19D); and

forming a cap oxide (1030) upon the glass layer 1008 via a second chemical vapor deposition process, the cap oxide layer protecting the glass layer from defect formation by shielding the glass layer from moisture which would result in the formation of defects if allowed to contact the glass layer, the cap oxide layer being formed at approximately 350°C; wherein a reactor (chamber 15) within which the first and second chemical vapor deposition processes are performed is not broken between the first and second chemical vapor deposition processes (*in-situ* process) (col. 40, lines 51 through col. 51 line 40, col. 61, lines 12-23, and Figs. 19A-19D). *Noted that without the USG capping layer, the dopant atoms diffuse upward away from the semiconductor material during rapid thermal process is considered to be "the formation of defects" (see col. 51 lines 15-18).*

The limitation the method is "for mitigating defect formation" has not been given patentable weight because it has been held that a preamble in denied the effect of a limitation where the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951).

**Regarding claim 8**, Frankel teaches wherein forming the cap oxide layer (1030) comprises forming an undoped oxide layer (USG or undoped silicate glass) upon the glass layer (col. 42, line 38).

**Regarding claim 9**, as best understood, Frankel teaches a method comprising:  
forming a glass layer (1008) upon a substrate (1004) (col. 40, lines 51 through col. 51 line 25, col. 61, lines 12-23, and Figs. 19A-19D); and

forming a cap oxide (1030) upon the (P-doped) glass layer (1008), the forming of the cap oxide layer comprising forming an undoped oxide layer (1030) upon a P doped glass oxide film (1008), wherein a reactor (chamber 15) within which the glass layer and the cap oxide layer are formed is not broken between the formation of the glass layer and the cap oxide layers (*in-situ* process), the cap oxide layer being formed at approximately 350°C (col. 40, lines 51 through col. 51 line 40, col. 61, lines 12-23, and Figs. 19A-19D).

Frankel teaches protecting the glass layer from defect formation, but fails to teach the oxide cap over the phosphosilicate glass layer for a period of time of at least about a day. It would be have been obvious to a person of ordinary skill in the art at the time of the invention was made to keep the oxide cap over the phosphosilicate glass layer, not only in a day, but may be for a period of time of longer than that in order to control diffusion of dopant atoms in the doped dielectric layer downward into the semiconductor material and improve stability and immunity to moisture absorption as taught by Frankel, column 52, lines 50-55. Also, the limitation the method is "for mitigating defect formation" has not been given patentable weight because it has been held that a preamble in denied the effect of a limitation where the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951).

**Regarding claim 10**, Frankel teaches a method comprising:

forming a glass layer (1008) upon a substrate (1004) (col. 40, lines 51 through col. 51 line 25, col. 61, lines 12-23, and Figs. 19A-19D); and

forming a cap oxide (1030) upon the glass layer (1008), the cap oxide layer being formed at approximately 350°C, wherein a reactor (chamber 15) within which the glass layer and the cap oxide layer are formed is not broken between the formation of the glass layer and the cap oxide layers (*in-situ* process), (col. 40, lines 51 through col. 51 line 40, col. 61, lines 12-23, and Figs. 19A-19D).

Frankel teaches forming the glass layer on the cap oxide, but fails to teach the oxide cap over the phosphosilicate glass layer for a period of time of at least about a day. It would be have been obvious to a person of ordinary skill in the art at the time of the invention was made to keep the oxide cap over the phosphosilicate glass layer, not only in a day, but may be for a period of time of longer than that in order to control diffusion of dopant atoms in the doped dielectric layer downward into the semiconductor material and improve stability and immunity to moisture absorption as taught by Frankel, column 52, lines 50-55. Also, the limitation the method is "for mitigating defect formation" has not been given patentable weight because it has been held that a preamble in denied the effect of a limitation where the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951).

**Regarding claim 11**, Frankel wherein the oxide cap (1030) is formed to have a thickness of about 50-500 Angstroms (col. 40, lines 51 through col. 51 line 25, col. 61, lines 12-23, and Figs. 19A-19D). Although Frankel's cap oxide layer thickness (50-500

Angstroms) is not in the claimed range (greater than 300 Angstroms), this does not define patentable over Frankel since the thickness is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art.

**Regarding claim 13**, Frankel teaches wherein the cap oxide layer (USG) 1030 is formed by  $\text{SiH}_4$  and  $\text{N}_2\text{O}$  reacting gases (col. 50, lines 45-46).

**Regarding claim 14**, Frankel teaches wherein the cap oxide layer (USG) 1030 is formed by TEOS and  $\text{O}_2$  reacting gases (col. 51, lines 40-45).

**Regarding claim 15**, Frankel teaches wherein the cap oxide layer 1030 process temperature is between approximately  $350^\circ\text{C}$  and approximately  $600^\circ\text{C}$  (col. 51, line 32).

**Regarding claim 16**, Frankel teaches wherein the glass layer 1008 process temperature is between approximately  $450^\circ\text{C}$  and approximately  $650^\circ\text{C}$  (col. 50, line 34).

**Regarding claim 17**, Frankel teaches wherein forming the cap oxide layer 1030 comprises forming inter-metal dielectric layers (IMD) (col. 50, lines 22-23).

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.


If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone numbers

Art Unit: 2818

of the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Quoc Hoang  
Patent examiner/AU 2818

  
08/29/2006